







## Evolution of Galapagos Island Finches

The finches on the Galapagos Islands look so different from one another that when Darwin first saw them he didn't realize they were all finches. The species he examined varied in the sizes and shapes of their beaks and in their feeding habits, as shown in Figure 1.

**Figure 1 Characteristics of Galapagos Island Finches**

Galápagos Islands Finches						
Shape of Head and Beak						
Common Name of Finch Species	Vegetarian tree finch	Large insectivorous tree finch	Woodpecker finch	Cactus ground finch	Sharp-beaked ground finch	Large ground finch
Main Food	Fruits	Insects	Insects	Cacti	Seeds	Seeds
Feeding Adaptation	Parrotlike beak	Grasping beak	Uses cactus spines	Large crushing beak	Pointed crushing beak	Large crushing beak
Habitat	Trees	Trees	Trees	Ground	Ground	Ground

1. [SP 3] Propose a hypothesis to explain the variety of finches found on the islands.
2. [SP 4] Suggest a problem with testing your hypothesis.
3. [SP 6] Using beak size as an example, identify two things that must be true in order for natural selection to be capable of producing the diversity observed.
4. [SP 7] Describe the relationship between the size and shape of the beak and the food source of a particular finch species.
5. [SP 7] When a physical trait or behavior affords a species increased fitness, it is called an adaptation. Identify two adaptations in the finches on the Galapagos Islands.

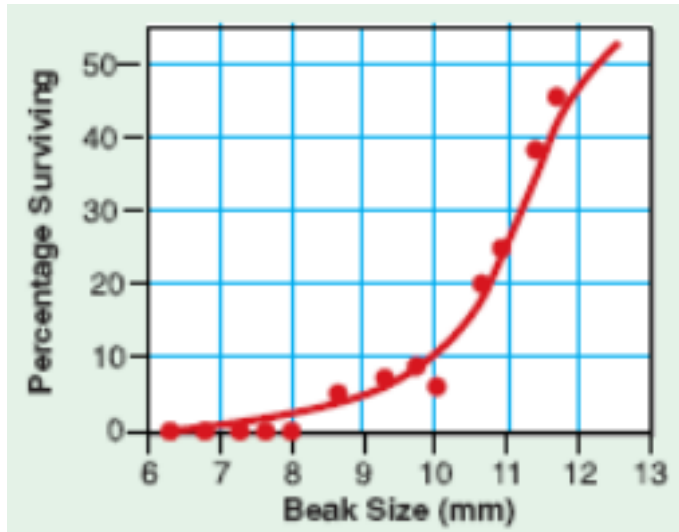
Peter and Rosemary Grant from Princeton University spent twenty years studying the finches in order to test the hypothesis that natural selection could account for the variety Darwin observed. They studied one species of finch by catching and identifying nearly every single bird of that species on one of the islands. Each year they recorded which birds were still alive and which had died, which had been successful in breeding and which had not. For each bird they also recorded wing length, leg length, beak length, beak depth, beak color, feather color, and body mass.

During the rainy season, food is plentiful and finches will eat whatever is most available. During a drought, however, some foods are scarce.

6. [SP 7] Why is the observation that some food sources are scarce during a drought important for proving that natural selection could account for the finch variety?

Over the twenty-year period of their study, the Grants collected data on beak size during periods of drought on the island. Their data are shown in Figure 2.

**Figure 2 Survival of finches and beak size**



7. [SP 5, SP 6] What does the graph tell us about the size of the finch beaks?
8. [SP 1, SP 6, SP 7] From the work done by the Grants, what can we say about the possibility of the variety of finches being explained by natural selection?
9. [SP 6, SP 7] Darwin noticed that different finches were found on different islands. From what you know about how speciation happens, propose an explanation for this observation.
10. [SP 7] Why were the finches important to shaping Darwin's ideas about natural selection?